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KINETICS OF CRYSTALLIZATION PROCESS OF BULK METALLIC GLASS FeCrMoGaPCB PREPARED BY COOPER MOLD CASTING

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Iron based alloys are the family of bulk metallic glasses (BMG) with a very high melting temperature (T_m) and highest critical cooling rates (R_c~10^3K/s) necessary to suppress nucleation of crystals during the casting process. Consequently, this class of BMG is the most difficult for preparation in a thick form.

The rods of Fe-based bulk metallic glasses with the nominal composition $Fe_{65.5}Cr_4Mo_4Ga_4P_{12}C_5B_{5.5}$ were cast by melt injection into a 1.5 and 1.8 mm diameter copper molds. DTA thermogram shows wide supercooled liquid region between crystallization temperature (T_x) and glass transition temperature (T_g) in the as-cast state $\Delta T_x = T_x - T_g = 57$ K.

The thermal stability and crystallization processes were investigated by non-isothermal differential thermal analysis (DTA) and X-ray diffraction (XRD). Thermal stability was discussed in terms of the width of supercooled liquid region ΔT_x. Calculation of kinetic parameters of crystallization process was preformed by nonisothermal measurements results using Kissinger method.